

Algebraic Concepts  
Lesson 18: Linear Equations, Slope and  
Direct Variation  
Math for Standards

Name \_\_\_\_\_

Date \_\_\_\_\_

*EQ: How do you identify lines from equations, apply the idea of slope, and work with direct variation?*

A linear equation gives the graph of a \_\_\_\_\_.

A linear equation has two \_\_\_\_\_ with no \_\_\_\_\_.

You can create a \_\_\_\_\_ for any equation to graph it.

If you have a linear equation in \_\_\_\_\_,

you can graph a point and use the slope to graph the rest ( $m$  stands for slope and  $b$  gives the  $y$  coordinate of the coordinate of the  $y$ -intercept).

\_\_\_\_\_ deals with the ratio of change in  $y$  over change in  $x$ ; rise over run.

Equation to find slope:

Horizontal lines have slope of \_\_\_\_\_; vertical lines have an  
\_\_\_\_\_ slope.

A line with a positive slope goes \_\_\_\_\_ from left to right, and a negative  
slope goes \_\_\_\_\_ from left to right.

Direct proportion is when both variables \_\_\_\_\_ and gives an  
equation \_\_\_\_\_, where  $k$  is the constant of variation.

Example 1: Find the slope of the line passing through (4, 5) and (12, 6). Then describe the line as it move from left to right.

Example 2: Find the slope and y-intercept of the graph of the equation.  
 $3x + 4y = 5$

Example 3: There are two health clubs on the same street. Club Global charges a sign-up fee of \$60 and then \$20 per month. Club Local had no sign-up fee, but charges \$30 per month.

- a. Write an equation for the cost  $C$  of using each health club for  $m$  months.
- b. Rewrite the equations using  $x$  as the independent variable  $y$  as the dependent variable.
- c. What is the slope of the line representing the cost of Club Global? Club Local?
- d. What do the slopes represent?
- e. What is the y-intercept of each graph?
- f. What do the y-intercepts represent?
- g. What is the cost of membership at each club for 6 months?

Example 4: Decide whether the relationship shows a direct variation. If it does, write the constant of variation and an equation of variation.

a.

Miles Driven $x$	23	46	69	92
Gallons Used $y$	1	2	3	4

b.

Miles Driven $x$	20	40	60	80
Gallons Used $y$	280	260	240	220